The Regulations of Connecticut State Agencies are amended by adding section 22a-153-3, as follows:

(NEW)

Sec. 22a-153-3. Industrial radiographic operations.

(a) Definitions. For the purposes of this section, the following definitions apply:

(1) “Annual refresher safety training" means a review conducted or provided by the licensee or registrant for its employees on radiation safety aspects of industrial radiography. The review shall include, as a minimum, any results of internal inspections, new procedures or equipment, new or revised regulations, and accidents or errors that have been observed. The review shall also provide opportunities for employees to ask safety questions.

(2) "ANSI" means the American National Standards Institute.

(3) "Associated equipment" means equipment that is used in conjunction with a radiographic exposure device to make radiographic exposures that drives, guides, or comes in contact with the source, including, but not limited to, guide tubes, control tubes, control (drive) cables, removable source stops, “J” tubes and collimators when used as an exposure head.

(4) "Cabinet radiography" means industrial radiography conducted in an enclosure or cabinet so shielded that every location on the exterior meets the dose limits for individual members of the public as specified in section 22a-153-2(f) of the Regulations of Connecticut State Agencies.

(5) "Cabinet x-ray system" means an x-ray system with the x-ray tube installed in an enclosure, hereinafter termed a cabinet that is independent of existing architectural structures except the floor. The cabinet x-ray system is intended to contain at least that portion of a material being irradiated, provide radiation attenuation and exclude personnel from its interior during generation of radiation. This definition includes x-ray systems designed primarily for the inspection of carry-on baggage at airline, railroad bus terminals and similar facilities. An x-ray tube used within a shielded part of a building, or x-ray equipment that may temporarily or occasionally incorporate portable shielding, is not considered a cabinet x-ray system.

(6) "Certifiable cabinet x-ray system" means an existing uncertified x-ray system that has been modified to meet the certification requirements specified in 21 CFR 1020.40.

(7) "Certified cabinet x-ray system" means an x-ray system that has been certified in accordance with 21 CFR 1010.2 as being manufactured and assembled pursuant to the provisions of 21 CFR 1020.40.

(8) "Certifying entity" means an independent certifying organization meeting the requirements in

(9) "Collimator" means a radiation shield that is placed on the end of the guide tube or directly onto a radiographic exposure device to restrict the size of the radiation beam when the sealed source is cranked into position to make a radiographic exposure.

(10) "Control cable" or "drive cable" means the cable that is connected to the source assembly and used to drive the source to and from the exposure location.

(11) "Control drive mechanism" means a device that enables the source assembly to be moved into and out of the exposure device.

(12) "Control tube" means a protective sheath for guiding the control cable. The control tube connects the control drive mechanism to the radiographic exposure device.

(13) "Effective date" means the date on which this section is adopted in accordance with the provisions of chapter 54 of the Connecticut General Statutes.

(14) "Exposure head" or "source stop" means a device that locates the gamma radiography sealed source in the selected working position.

(15) "Field station" means a facility from which sources of radiation may be stored or used and from which equipment is dispatched.

(16) "Guide tube" or "projection sheath" means a flexible or rigid tube, or "J" tube, for guiding the source assembly and the attached control cable from the exposure device to the exposure head. The guide tube may also include the connections necessary for attachment to the exposure device and to the exposure head.

(17) "Hands-on experience" means experience in all of those areas considered to be directly involved in the radiography process, and includes taking radiographs, calibration of survey instruments, operational and performance testing of survey instruments and devices, film development, posting of radiation areas, transportation of radiography equipment, posting of records and radiation area surveillance, etc., as applicable. Excessive time spent in only one or two of these areas, such as film development or radiation area surveillance, should not be counted toward the 2000 hours of hands-on experience required for a radiation safety officer subsection (m)(2)(A)(ii) of this section or the hands-on experience for a radiographer as required by subsection (m)(3)(A) of this section.

(18) "Independent certifying organization" means an independent organization that meets all of the criteria of Appendix A of this part.

(19) "Industrial radiography" or "radiography" means an examination of the structure of materials by the nondestructive utilization of ionizing radiation to make radiographic images.

(20) "Lay-barge radiography" means industrial radiography performed on any water vessel used for laying pipe.

(21) "NVLAP" means the National Voluntary Laboratory Accreditation Program.

(22) "Offshore platform radiography" means industrial radiography conducted from a platform over a body of water.

(23) "Permanent radiographic installation" means an enclosed shielded room, cell or vault, not located at a temporary jobsite, in which radiography is performed.

(24) "Practical examination" means a demonstration through application of the safety rules and principles in industrial radiography including use of all procedures and equipment to be used by radiographic personnel.

(25) "Radiation safety officer for industrial radiography" means an individual with the responsibility for the overall radiation safety program on behalf of the licensee or registrant and who meets the requirements of subsection (m)(2) of this section.

(26) "Radiographer" means any individual who performs or who, in attendance at the site where the sources of radiation are being used, personally supervises industrial radiographic operations and who is responsible to the licensee or registrant for assuring compliance with the requirements of the Department's regulations and the conditions of a license or registration issued by the Commissioner.

(27) "Radiographer certification" means written approval received from a certifying entity stating that an individual has satisfactorily met the radiation safety, testing and experience criteria subsection (m)(2)(A)(ii) of this section.

(28) "Radiographer's assistant" means any individual who under the direct supervision of a radiographer, uses radiographic exposure devices, sources of radiation, related handling tools or radiation survey instruments in industrial radiography.

(29) "Radiographic exposure device," "camera" or "projector" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.

(30) "Radiographic operations" means all activities performed with a radiographic exposure device or with a radiation machine. Activities include using, transporting except by common or contract carriers, or storing at a temporary job site, performing surveys to confirm the adequacy of boundaries, setting up equipment and any activity inside restricted area boundaries. Transporting a radiation machine is not considered a radiographic operation.

(31) "S-tube" means a tube through which the radioactive source travels when inside a radiographic exposure device.

(32) "Sealed source" or "pill" means any radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material.

(33) "Shielded position" means the location within the radiographic exposure device, source changer, or storage container that, by manufacturer’s design, is the proper location for storage of the sealed source.

(34) "Source assembly" or "pigtail" means an assembly that consists of the sealed source and a connector that attaches the source to the control cable. The source assembly may include a ball stop to secure the source in the shielded position.

(35) "Source changer" means a device designed and used for replacement of sealed sources in radiographic exposure devices, or for transporting and storing sealed sources.

(36) "Storage area" means any location, facility or vehicle that is used to store and secure a radiographic exposure device, a radiation machine or a storage container when it is not used for radiographic operations. Storage areas are locked or have a physical barrier to prevent accidental exposure, tampering or unauthorized removal of the device, machine or container.

(37) "Storage container" means a device in which sealed sources or radiation machines are secured and stored.

(38) "Temporary jobsite" means a location where radiographic operations are performed and where sources of radiation may be stored other than the location(s) of use authorized on the license or registration.

(39) "Underwater radiography" means radiographic operations performed when the radiographic exposure device or radiation machine or related equipment is beneath the surface of the water.

(1) **(b) Applicability.** Except as otherwise provided in this subsection, this section applies to all owners and operators of sources of radiation used in industrial radiography, inclusive of radiation machines and sealed radioactive sources;

(2) This section shall not apply to medical uses of sources of radiation that are subject to 22a-153-7 and 22a-153-8.

(3) This section shall not apply to the use of certified and certifiable cabinet x-ray systems, except for the following:

(A) No registrant shall permit any individual to operate a cabinet x-ray system until the individual has received a copy of and instruction in the operating procedures for the unit. Records that demonstrate compliance with this subparagraph shall be maintained inspection by the Commissioner until disposal is authorized by the Commissioner;

(B) Tests for proper operation of interlocks shall be conducted and recorded at intervals not to exceed six (6) months. Records of these tests shall be maintained inspection by the Commissioner until disposal of such records is authorized by the Commissioner;

(C) The registrant shall perform an evaluation of the radiation dose rates to determine compliance with section 22a-153-2(f) of the Regulations of Connecticut State Agencies and 21 CFR 1020.40, at intervals not to exceed one year. Records of these evaluations shall be maintained for inspection by the Commissioner for five (5) years after the evaluation; and

(D) Certified cabinet x-ray systems shall be maintained in compliance with 21 CFR 1020.40, and no modification shall be made to such systems unless prior approval has been granted by the Commissioner.

(4) This section shall not apply to industrial uses of hand-held light intensified imaging devices if the dose rate eighteen (18) inches from the source of radiation to any individual does not exceed two (2) millirem per hour. Devices that exceed this limit shall meet the applicable requirements of this section.

(c) Licensing and registration requirements for industrial radiography operations.

To obtain a specific license for the use of licensed material or to register the use of a radiation machine, the owner or operator of such material or machine shall submit documentation of the information identified in this subsection to the Commissioner:

(1) An adequate program for training radiographers and radiographer's assistants that meets the requirements of subsection (m)(3) of this section, as follows:

(A) After two years from the effective date of this section, the applicant need not describe the initial training and examination program for radiographers in the subjects outlined in subsection (m)(3)(G) of this section; and

(B) For two years from the effective date of this section, the applicant may affirm that all individuals acting as industrial radiographers will be certified in radiation safety by a certifying entity before commencing duty as radiographers. This affirmation substitutes for a description of its initial training and examination program for radiographers in the subjects outlined in subsection (m)(3)(G) of this section.

(2) Procedures for verifying and documenting the certification status of radiographers and for ensuring that the certification of individuals acting as radiographers remains valid.

(3) Written operating and emergency procedures as described in subsection (m)(4) of this section.

(4) The applicant submits a description of a program for inspections of the job performance of each radiographer and radiographer’s assistant at intervals not to exceed 6 months as described in subsection (m)(3)(E) of this section.

(5) A description of the applicant's overall organizational structure as it applies to the radiation safety responsibilities in industrial radiography, including specified delegation of authority and responsibility.

(6) The qualifications of the individual(s) designated as the radiation safety officer as described in subsection (m)(2)(A) of this section.

(7) If an applicant intends to perform leak testing of sealed sources or exposure devices containing depleted uranium (DU) shielding, the procedures for performing the test. The description shall include the:

(A) Methods of collecting the samples;

(B) Qualifications of the individual who analyzes the samples;

(C) Instruments to be used; and

(D) Methods of analyzing the samples.

(8) If the applicant intends to perform calibrations of survey instruments and alarming ratemeters, the methods to be used and the experience of the person(s) who will perform the calibrations. All calibrations shall be performed according to the procedures described and at the intervals prescribed in subsections (h) and (m)(6)(G)(iv) of this section.

(9) Identification and description of the location(s) of all field stations and permanent radiographic installations.

(10) Identification of the location(s) where all records required by this section and other sections of the Department's regulations for sources of radiation applicable to the owner or operator will be maintained.

(11) If a license application includes underwater radiography, a description of:

(A) Radiation safety procedures and radiographer responsibilities unique to the performance of underwater radiography;

(B) Radiographic equipment and radiation safety equipment unique to underwater radiography; and

(C) Methods for gas-tight encapsulation of equipment.

(12) If an application includes offshore platform and/or lay-barge radiography, a description of:

(A) Transport procedures for radioactive material to be used in industrial radiographic operations;

(B) Storage facilities for radioactive material; and

(C) Methods for restricting access to radiation areas.

(13) The Commissioner will issue a written license or registration to the applicant who submits the information, as applicable, required by this subsection. The Commissioner will contact an applicant in writing if the Commissioner requires additional information, specifying a date for submission of such additional information, before the Commissioner may issue a registration or license pursuant to this subsection.

(d) Performance requirements for industrial radiography equipment. Equipment used in industrial radiographic operations shall meet the following minimum criteria:

(1) Each radiographic exposure device, source assembly or sealed source, and all associated equipment shall meet the requirements specified in ANSI, N432-1980 "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," (NBS Handbook 136, January 1981).

(2) In addition to the requirements specified in subdivision (1) of this subsection, the following requirements apply to radiographic exposure devices, source changers, source assemblies and sealed sources:

(A) The licensee shall ensure that each radiographic exposure device has attached to it a durable, legible, clearly visible label bearing the:

(i) Chemical symbol and mass number of the radionuclide in the device,

(ii) Activity and the date on which this activity was last measured,

(iii) Model or product code and serial number of the sealed source,

(iv) Name of the manufacturer of the sealed source, and

(v) Licensee's name, address, and telephone number;

(B) Radiographic exposure devices intended for use as Type B packages shall meet the applicable transportation requirements of 49 CFR Part 100-189, Part 390-397 and 10 CFR Part 71.

(C) Modification of radiographic exposure devices, source changers, and source assemblies and associated equipment is prohibited, unless approved by the Commissioner.

(3) In addition to the requirements specified in subsections (d)(1) and (d)(2) of this section, the following requirements apply to radiographic exposure devices, source assemblies and associated equipment that allow the source to be moved out of the device for radiographic operations or to source changers:

(A) The coupling between the source assembly and the control cable shall be designed in such a manner that the source assembly will not become disconnected if cranked outside the guide tube. The coupling shall be such that it cannot be unintentionally disconnected under normal and reasonably foreseeable abnormal conditions;

(B) The device shall automatically secure the source assembly when it is cranked back into the fully shielded position within the device. This securing system may only be released by means of a deliberate operation on the exposure device;

(C) The outlet fittings, lock box and drive cable fittings on each radiographic exposure device shall be equipped with safety plugs or covers, which shall be installed during storage and transportation to protect the source assembly from water, mud, sand or other foreign matter;

(D) Each sealed source or source assembly shall have attached to it or engraved on it, a durable, legible, visible label with the words:

"DANGER -- RADIOACTIVE"
or
"CAUTION -- RADIOACTIVE"

The label may not interfere with the safe operation of the exposure device or associated equipment;

(E) The guide tube shall be able to withstand a crushing test that closely approximates the crushing forces that are likely to be encountered during use and be able to withstand a kinking resistance test that closely approximates the kinking forces that are likely to be encountered during use;

(F) Guide tubes shall be used when moving the source out of the device;

(G) An exposure head or similar device designed to prevent the source assembly from passing out of the end of the guide tube shall be attached to the outermost end of the guide tube during industrial radiography operations;

(H) The guide tube exposure head connection shall be able to withstand the tensile test for control units specified in ANSI N432-1980; and

(I) Source changers shall provide a system for ensuring that the source will not be accidentally withdrawn from the changer when connecting or disconnecting the drive cable to or from a source assembly.

(4) All radiographic exposure devices and associated equipment in use after the effective date of this section, shall comply with the requirements of this section.

(5) Notwithstanding subsection (d)(1) of this section, equipment used in industrial radiographic operations need not comply with § 8.9.2(c) of the Endurance Test in American National Standards Institute N432-1980, if the prototype equipment has been tested using a torque value representative of the torque that an individual using the radiography equipment can reasonably exert on the lever or crankshaft of the drive mechanism.

(e) **Limits on external radiation levels from storage containers and source changers.** The maximum exposure rate limits for storage containers and source changers are 2 millisieverts (200 mrem) per hour at any exterior surface, and 0.1 millisieverts (10 mrem) per hour at 1 meter from any exterior surface with the sealed source in the shielded position.

(f) Locking of sources of radiation, storage containers and source changers.

(1) Each radiographic exposure device shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The exposure device and/or its container shall be kept locked when not under the direct surveillance of a radiographer or a radiographer's assistant except at permanent radiographic installations as stated in subsection (m)(8) of this section. If the lock is keyed, the key shall be removed after opening and closing and lock mechanism. In addition, during radiographic operations the sealed source assembly shall be secured in the shielded position each time the source is returned to that position.

(2) Each sealed source storage container and source changer shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. Storage containers and source changers shall be kept locked when containing sealed sources except when under the direct surveillance of a radiographer or a radiographer's

assistant. If the lock is keyed, the key shall be removed after opening and closing and lock mechanism.

(3) The control panel of each radiation machine shall be equipped with a lock that will prevent the unauthorized use of an x-ray system or the accidental production of radiation. The radiation machine shall be kept locked and the key removed at all times except when under the direct visual surveillance of a radiographer or a radiographer's assistant.

(g) Labeling, storage and transportation. [Sec. E.14.]

(1) The licensee shall not use a source changer or a container to store radioactive material unless the source changer or the storage container has securely attached to it a durable, legible and clearly visible label bearing the standard radiation symbol described in section 22a-153-2(l)(1) of the Regulations of Connecticut State Agencies and the wording:

CAUTION [or DANGER]
RADIOACTIVE MATERIAL
NOTIFY CIVIL AUTHORITIES [or " NAME OF COMPANY"]

(2) The licensee shall not transport radioactive material unless the material is packaged, and the package is labeled, marked, and accompanied with appropriate shipping papers in accordance with 49 CFR Part 100-189, 390-397 and 10 CFR Part 71.

(3) Radiographic exposure devices, source changers, storage containers and radiation machines shall be physically secured to prevent tampering or removal by unauthorized personnel. The licensee shall store radioactive material in a manner that will minimize danger from explosion or fire.

(4) The licensee shall lock and physically secure the transport package containing radioactive material in the transporting vehicle to prevent accidental loss, tampering or unauthorized removal.

(5) The licensee's or registrant's name and city or town where the main business office is located shall be prominently displayed with a durable, clearly visible label(s) on both sides of all vehicles used to transport radioactive material or radiation machines for temporary job site use.

(h) Radiation survey instruments.

(1) The licensee or registrant shall keep sufficient calibrated and operable radiation survey instruments at each location where sources of radiation are present to make the radiation surveys required by this section and section 22a-153-2 of the Regulations of Connecticut State Agencies. Instrumentation required by this section shall be capable of measuring a range from 0.02 millisieverts (2 mrem) per hour through 0.01 sievert (1 rem) per hour.

(2) The licensee or registrant shall have each radiation survey instrument required under subsection (h)(1) of this section calibrated:

(A) At energies appropriate for use and at intervals not to exceed six (6) months or after instrument servicing, except for battery changes;

(B) For linear scale instruments, at two points located approximately one-third and two-thirds of full-scale on each scale; for logarithmic scale instruments, at mid-range of each decade, and at two points of at least one decade; and for digital instruments, at 3 points between 0.02 and 10 millisieverts (2 and 1000 mrem) per hour; and

(C) To achieve an accuracy within plus or minus 20 percent of the true radiation dose rate at each point checked.

(3) The licensee or registrant shall maintain records of the results of the instrument calibrations in accordance with subsection (n)(3) of this section.

(i) Leak testing and replacement of sealed sources.

(1) The replacement of any sealed source fastened to or contained in a radiographic exposure device and leak testing of any sealed source shall be performed by a person authorized to do so by the Department, NRC or another Agreement State.

(2) The opening, repair or modification of any sealed source shall be performed by a person specifically authorized to do so by the Department, NRC or another Agreement State.

(3) Testing and recordkeeping requirements. Each licensee who uses a sealed source shall:

(A) Have the source tested for leakage at intervals not to exceed six (6) months. The leak testing of the source shall be performed using a method approved by the Department, NRC or by another Agreement State. The wipe sample shall be taken from the nearest accessible point to the sealed source where contamination might accumulate and shall be analyzed for radioactive contamination. The analysis shall be capable of detecting the presence of 185 bequerel (0.005 μCi) of radioactive material on the test sample and shall be performed by a person specifically authorized by Department, NRC or another Agreement State to perform the analysis;

(B) Maintain records of the leak tests in accordance with subsection (n)(4) of this section; and

(C) Unless a sealed source is accompanied by a certificate from the transferor that shows that it has been leak tested within six (6) months before the transfer, it shall not be used by the licensee until tested for leakage. Sealed sources that are in storage and not in use do not require leak testing, but shall be tested before use or transfer to another person if the interval of storage exceeds six (6) months.

(4) Any test conducted pursuant to subsections (i)(2) and (i)(3) of this section that reveals the presence of 185 becquerel (0.005 μCi) or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the equipment involved from use and shall have it decontaminated and repaired or disposed of in accordance with the Department's regulations. A report shall be filed with the Commissioner within five days of any test with results that exceed the threshold in this paragraph, describing the equipment involved, the test results, and the corrective action taken.

(5) Each exposure device using depleted uranium (DU) shielding and an "S" tube configuration shall be tested for DU contamination at intervals not to exceed **13** months. The analysis shall be capable of detecting the presence of 185 becquerel (0.005 μCi) of radioactive material on the test sample and shall be performed by a person specifically authorized by the Department, NRC or another Agreement State to perform the analysis. Should such testing reveal the presence of DU contamination, the exposure device shall be removed from use until an evaluation of the wear of the S-tube has been made. Should the evaluation reveal that the S-tube is worn through, the device may not be used again. DU shielded devices do not have to be tested for DU contamination while not in use and in storage. Before using or transferring such a device, however, the device shall be tested for DU contamination, if the interval of storage exceeds 12 months. A record of the DU leak-test shall be made in accordance with subsection (n)(4) of this section.

(j) Quarterly inventory. Each licensee or registrant shall:

(1) Conduct a quarterly physical inventory to account for all sources of radiation and for devices containing DU that are received and possessed under the license; and

(2) T Maintain records of the quarterly inventory in accordance with subsection (n)(5) of this section.

(k) Inspection and maintenance of radiation machines, radiographic exposure devices, transport and storage containers, associated equipment, source changers and survey instruments.

(1) The licensee or registrant shall perform visual and operability checks on survey meters, radiation machines, radiographic exposure devices, transport and storage containers, associated equipment and source changers before each day's use, or work shift, to ensure that:

(A) The equipment is in good working condition;

(B) The sources are adequately shielded; and

(C) Required labeling is present.

(2) Survey instrument operability shall be performed using check sources or other appropriate means.

(3) If equipment problems are found, the equipment shall be removed from service until repaired.

(4) Each licensee or registrant shall have written procedures for and perform inspection and routine maintenance of radiation machines, radiographic exposure devices, source changers, associated equipment, transport and storage containers, and survey instruments at intervals not to exceed three months or before the first use thereafter to ensure the proper functioning of components important to safety. If equipment problems are found, the equipment shall be removed from service until repaired.

(5) The licensee's inspection and maintenance program shall include procedures to assure that Type B packages are shipped and maintained in accordance with the certificate of compliance or other approval.

(6) Records of equipment problems and of any maintenance performed under this subsection shall be made in accordance with subsection (n)(7) of this section.

(l) Permanent radiographic installations.

(1) The licensee or registrant shall equip each entrance that is used for personnel access to a high radiation area in a permanent radiographic installation with either:

(A) An entrance control of the type described in section 22a-153-2(i) of the Regulations of Connecticut State Agencies that causes the radiation level upon entry into the area to be reduced; or

(B) Both conspicuous visible and audible warning signals to warn of the presence of radiation. The visible signal shall be actuated by radiation whenever the source is exposed or the machine is energized. The audible signal shall be actuated when an attempt is made to enter the installation while the source is exposed or the machine is energized.

(2) The system installed pursuant to subdivision (1) of this subsection shall be tested for proper operation with a radiation source each day before the installation is used for radiographic operations. The test shall include a check of both the visible and audible signals. Entrance control devices that reduce the radiation level upon entry as designated in subdivision (1)(A) of this subsection shall be tested monthly. If an entrance control device or an alarm is operating improperly, the licensee or registrant shall label the equipment as defective and shall make repairs within seven (7) calendar days. The facility may continue to be used during this seven-day period, provided the licensee or registrant implements the continuous surveillance requirements of subsection (m)(8) of this section and uses an alarming ratemeter. Test records for entrance controls and audible and visual alarms shall be maintained in accordance with subsection (n)(8) of this section.

(m) Radiation safety requirements.

(1) Conducting industrial radiographic operations.

(A) Whenever radiography is performed at a location other than a permanent radiographic installation, the radiographer shall be accompanied by at least one other qualified radiographer or an individual who has at a minimum met the requirements of subsection (m)(3)(C). The additional qualified individual shall observe the operations and be capable of providing immediate assistance to prevent unauthorized entry. Radiography may not be performed if only one qualified individual is present.

(B) All radiographic operations shall be conducted in a permanent radiographic installation unless otherwise specifically authorized by the Commissioner.

(C) Except when physically impossible, collimators shall be used in industrial radiographic operations that use radiographic exposure devices that allow the source to be moved out of the device.

(D) A licensee or registrant may conduct lay-barge, offshore platform or underwater radiography only if procedures have been approved by the Commissioner, the NRC or by another Agreement State.

(2) Radiation safety officer. To ensure that radiation safety activities are being performed in accordance with approved procedures and regulatory requirements in the daily operation of the licensee's or registrant's program, each registrant or licensee shall employ a radiation safety officer as follows:

(A) The minimum qualifications, training and experience for radiation safety officers for industrial radiography shall include:

(i) Completion of the training and testing requirements of subsection (m)(3)(A) of this section,

(ii) 2000 hours of hands-on experience as a qualified radiographer in industrial radiographic operations, and

(iii) Formal training in the establishment and maintenance of a radiation protection program;

(B) The Commissioner may consider alternatives to the requirements of subparagraph (A) of this subdivision when the radiation safety officer has appropriate training and experience in the field of ionizing radiation, and in addition, has adequate formal training with respect to the establishment and maintenance of a radiation safety protection program;

(C) The specific duties and authorities of the radiation safety officer shall include:

(i) Establishing and overseeing all operating, emergency and ALARA procedures as required by section 22a-174-2 of the Regulations of Connecticut State Agencies and reviewing such procedures regularly to ensure that they conform to the Department's regulations and license or registration conditions,

(ii) Overseeing and approving the training program for radiographic personnel to ensure that appropriate and effective radiation protection practices are taught,

(iii) Ensuring that required radiation surveys and leak tests are performed and documented in accordance with this section, including any corrective measures when levels of radiation exceed established limits,

(iv) Ensuring that personnel monitoring devices are calibrated, if applicable, and used properly; that records are kept of the monitoring results; and that timely notifications are made as required by section 22a-174-2 of the Regulations of Connecticut State Agencies, and

(v) Ensuring that operations are conducted safely and for implementing corrective actions including terminating operations; and

(D) Licensees and registrants shall meet the requirements of subsections (m)(2)(A) and (m)(2)(B) of this section no later than two years from the effective date of this section.

(3) Training. A licensee or registrant shall meet the following requirements related to training of individuals working with equipment used for radiography:

(A) The licensee or registrant shall not permit any individual to act as a radiographer until the individual:

(i) Has received at least 40 hours of training in the subjects outlined in subsection (m)(3)(G) of this section in addition to on-the-job training consisting of hands-on experience under the supervision of a radiographer and is certified through a radiographer certification program by a certifying entity in accordance with the criteria specified in Appendix A of this Part. The on-the-job training shall include a minimum of two (2) months (320 hours) of active participation in the performance of industrial radiography utilizing radioactive material or one month (160 hours) of active participation in the performance of industrial radiography utilizing radiation machines. Individuals performing industrial radiography utilizing radioactive materials and radiation machines shall complete both segments of the on-the-job training (3 months or 480 hours), or

(ii) The licensee or registrant may, until two years from the effective date of this section allow an individual who has not met the requirements of subdivision (3)(A)(i) of this subsection, to act as a radiographer after the individual has received at least 40 hours of training in the subjects outlined in subdivision (3)(G) of this subsection and demonstrated an understanding of these subjects by successful completion of a written examination that was previously submitted to and approved by the Department, NRC or another Agreement State, in addition to on-the-job training consisting of hands-on experience under the supervision of a radiographer. The on-the-job training shall include a minimum of two months (320 hours) of active participation in the performance of industrial radiography utilizing radioactive material or one month (160 hours) of active participation in the performance of industrial radiography utilizing radiation machines. Individuals performing industrial radiography utilizing radioactive materials and radiation machines shall complete both segments of the on-the-job training (three months or 480 hours);

(B) In addition to the requirements of subparagraph (A) of this subdivision, the licensee or registrant shall not permit any individual to act as a radiographer until the individual:

(i) Has received copies of and instruction in the requirements described in this section and other applicable sections of the Department's regulations cited in the license or registration under which the radiographer will perform industrial radiography, and the licensee's or registrant’s operating and emergency procedures,

(ii) Has demonstrated an understanding of items in subpargraph (B)(i) of this subdivision by successful completion of a written or oral examination,

(iii) Has received training in the use of the registrant's radiation machines, or the licensee's radiographic exposure devices, sealed sources, in the daily inspection of devices and associated equipment and in the use of radiation survey instruments, and

(iv) Has demonstrated understanding of the use of the equipment described in subparagraph (B)(iii) of this subdivision by successful completion of a practical examination;

(C) The licensee or registrant may not permit any individual to act as a radiographer's assistant until the individual:

(i) Has received copies of and instruction in the requirements described in the regulations contained in this section, and other applicable sections of the Department's regulations cited in the license or registration under which the radiographer's assistant will perform industrial radiography, and the licensee's or registrant's operating and emergency procedures,

(ii) Has demonstrated an understanding of items in subparagraph (C)(i) of this subdivision by successful completion of a written or oral examination,

(iii) Under the personal supervision of a radiographer, has received training in the use of the registrant's radiation machines, or the licensee's radiographic exposure devices and sealed sources, in the daily inspection of devices and associated equipment, and in the use of radiation survey instruments, and

(iv) Has demonstrated understanding of the use of the equipment described in subparagraph (C)(iii) of this subdivision by successful completion of a practical examination;

(D) The licensee or registrant shall provide annual refresher safety training for each radiographer and radiographer's assistant at intervals not to exceed 13 months;

(E) Except as provided in subparagraph (E)(iv) of this subdivision, the radiation safety officer or designee shall conduct an inspection program of the job performance of each radiographer and radiographer's assistant to ensure that the Department's regulations, license or registration requirements, and operating and emergency procedures are followed. The inspection program shall:

(i) Include observation of the performance of each radiographer and radiographer's assistant during an actual industrial radiographic operation, at intervals not to exceed six months,

(ii) Provide that, if a radiographer or a radiographer's assistant has not participated in an industrial radiographic operation for more than six months since the last inspection, the radiographer shall demonstrate knowledge of the training requirements of subparagraph (B)(iii) of this subdivision and the

radiographer's assistant shall demonstrate knowledge of the training requirements of subparagraph (C)(iii) of this subdivision by a practical examination before these individuals can next participate in a radiographic operation,

(iii) The Commissioner may consider alternatives in those situations where the individual serves as both radiographer and radiation safety officer, and

(iv) In those operations where a single individual serves as both radiographer and radiation safety officer, and performs all radiography operations, an inspection program is not required;

(F) The licensee or registrant shall maintain records of the training performed pursuant to this subdivision including certification documents, written, oral and practical examinations and responses, refresher safety training and inspections of job performance as required by this section;

(G) The licensee or registrant shall include the following subjects in the training required by subdivision (3)(A) of this subsection (n)(9) of this section:

(i) Fundamentals of radiation safety including:

(a) Characteristics of gamma and x-radiation,

(b) Units of radiation dose and quantity of radioactivity,

(c) Hazards of exposure to radiation,

(d) Levels of radiation from sources of radiation, and

(e) Methods of controlling radiation dose (time, distance and shielding),

(ii) Radiation detection instruments including:

(a) Use, operation, calibration and limitations of radiation survey instruments,

(b) Survey techniques, and

(c) Use of personnel monitoring equipment,

(iii) Equipment to be used including:

(a) Operation and control of radiographic exposure equipment, remote handling equipment, and storage containers, including pictures or models of source assemblies,

(b) Operation and control of radiation machines,

(c) Storage, control, and disposal of sources of radiation, and

(d) Inspection and maintenance of equipment,

(iv) The requirements of pertinent state and federal regulations, and

(v) Case histories of accidents in radiography; and

(H) Licensees and registrants will have one year from the effective date of this rule to comply with the additional training requirements specified in subdivisions (3)(B)(i) and (3)(C)(i) of this subsection.

(4) Operating and emergency procedures. Each licensee or registrant shall implement the following measures regarding operating and emergency procedures:

(A) Operating and emergency procedures shall include, as a minimum, instructions for radiography personnel in the following:

(i) Appropriate handling and use of sources of radiation so that no person is likely to be exposed to radiation doses in excess of the limits established in section 22a-153-2 of the Regulations of Connecticut State Agencies,

(ii) Methods and occasions for conducting radiation surveys,

(iii) Methods for posting and controlling access to radiographic areas,

(iv) Methods and occasions for locking and securing sources of radiation,

(v) Personnel monitoring and the use of personnel monitoring equipment,

(vi) Transporting equipment to field locations, including packing of radiographic exposure devices and storage containers in the vehicles, placarding of vehicles when required, and control of the equipment during transportation as described in 49 CFR Part 100-189, 390-397 and 10 CFR Part 71.

(vii) The inspection, maintenance and operability checks of radiographic exposure devices, radiation machines, survey instruments, alarming ratemeters, transport containers and storage containers,

(viii) Steps that shall be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale or an alarming ratemeter alarms unexpectedly,

(ix) Procedure(s) for identifying and reporting defects and noncompliance, as required by this section,

(x) The procedure for notifying proper persons in the event of an accident or incident,

(xi) Minimizing exposure of persons in the event of an accident or incident, including a source disconnect, a transport accident or loss of a source of radiation,

(xii) Source recovery procedure if licensee will perform source recoveries, and

(xiii) Maintenance of records, and

(B) The licensee or registrant shall maintain copies of current operating and emergency procedures as required by this section, in a location(s) readily accessible to all radiography personnel at each job site and available for inspection by the Commissioner upon request.

(5) Supervision of radiographer's assistants. The radiographer's assistant shall be under the personal supervision of a radiographer when using radiographic exposure devices, associated equipment, or a sealed source, or while conducting radiation surveys required by subdivision (7)(B) of this subsection to determine that the sealed source has returned to the shielded position or the radiation machine is off after an exposure. The personal supervision shall include:

(A) The radiographer's physical presence at the site where the sources of radiation are being used;

(B) The availability of the radiographer to give immediate assistance if required; and

(C) The radiographer's direct observation of the assistant's performance of the operations referred to in this section.

(6) Personnel monitoring. Each licensee or registrant shall meet the following requirements for monitoring of personnel:

(A) The licensee or registrant shall not permit an individual to act as a radiographer or a radiographer's assistant unless, at all times during radiographic operations, the individual wears, on the trunk of the body, a direct reading dosimeter, an operating alarming ratemeter and a personnel dosimeter that is processed and evaluated by an accredited NVLAP processor. At permanent radiographic installations where other appropriate alarming or warning devices are in routine use, or during radiographic operations using radiation machines, the use of an alarming ratemeter is not required. Personnel monitors shall meet the following requirements:

(i) Pocket dosimeters shall have a range from zero to two millisieverts (200 mrem) and shall be recharged at the start of each shift. Electronic personal dosimeters may only be used in place of ion-chamber pocket dosimeters,

(ii) Each personnel dosimeter shall be assigned to and worn by only one individual,

(iii) Film badges shall be exchanged at periods not to exceed one month and other personnel dosimeters processed and evaluated by an accredited NVLAP processor shall be replaced at periods not to exceed three months, and

(iv) After replacement, each film badge shall be returned to the supplier for processing within fourteen calendar days of the end of the monitoring period, or as soon as practicable. In circumstances that make it impossible to return each film badge in fourteen calendar days, such circumstances shall be documented and available for review by the Commissioner. Other personnel dosimeters shall be processed as soon as possible;

(B) Direct reading dosimeters such as pocket dosimeters or electronic personal dosimeters, shall be read and the exposures recorded at the beginning and end of each shift, and records shall be maintained in accordance with this section;

(C) Pocket dosimeters and electronic personal dosimeters shall be checked at periods not to exceed 13 months for correct response to radiation, and records shall be maintained in accordance with this section. Acceptable dosimeters shall read within plus or minus 20 percent of the true radiation exposure;

(D) If an individual's pocket dosimeter is found to be off-scale, or the electronic personal dosimeter reads greater than 2 millisieverts (200 mrem), the RSO shall be notified and the individual's film badge or other personnel dosimeter shall be sent for processing within 24 hours. In circumstances that make it impossible to process a film badge or personnel dosimeter in 24 hours, such circumstances shall be documented and available for review by the Commissioner. In addition, the individual shall not resume work associated with the use of sources of radiation until a determination of the individual's radiation exposure has been made. This determination shall be made by the radiation safety officer or the radiation safety officer's designee. The results of this determination shall be included in the records maintained in accordance with this section;

(E) If a film badge or other personnel dosimeter is lost or damaged, the worker shall cease work immediately until a replacement film badge or other personnel dosimeter is provided and the exposure is calculated for the time period from issuance to loss or damage of the film badge or other personnel dosimeter. The results of the calculated exposure and the time period for which the film badge or other personnel dosimeter was lost or damaged shall be included in the records maintained in accordance with this section;

(F) Reports received from the film badge or other personnel dosimeter processor shall be retained in accordance with this section; and

(G) Each alarming ratemeter shall:

(i) Be checked to ensure that the alarm functions properly before using at the start of each shift,

(ii) Be set to give an alarm signal at a preset dose rate of five millisieverts (500 mrem) per hour; with an accuracy of plus or minus 20 percent of the true radiation dose rate,

(iii) Require special means to change the preset alarm function, and

(iv) Be calibrated at periods not to exceed 12 months for correct response to radiation. The licensee shall maintain records of alarming ratemeter calibrations in accordance with this section.

(7) Radiation surveys. The licensee or registrant shall:

(A) Conduct all surveys with a calibrated and operable radiation survey instrument that meets the requirements of subsection (h) of this section;

(B) Conduct a survey of the radiographic exposure device and the guide tube after each exposure when approaching the device or the guide tube. The survey shall determine that the sealed source has returned to its shielded position before exchanging films, repositioning the exposure head, or dismantling equipment. Radiation machines shall be surveyed after each exposure to determine that the machine is off;

(C) Conduct a survey of the radiographic exposure device whenever the source is exchanged and whenever a radiographic exposure device is placed in a storage area as defined in subsection (a) of this section, to ensure that the sealed source is in its shielded position; and

(D) Maintain records in accordance with this section.

(8) Surveillance. During each radiographic operation, the radiographer shall ensure continuous direct visual surveillance of the operation to protect against unauthorized entry into a radiation area or a high radiation area, as defined in section 22a-153-1 of the Regulations of Connecticut State Agencies, except at permanent radiographic installations where all entryways are locked and the requirements of subsection (l) of this section are met.

(9) Posting. All areas in which industrial radiography is being performed shall be conspicuously posted as required by section 22a-153-2(l)(2) of the Regulations of Connecticut State Agencies. The exceptions listed in section 22a-153-2(l)(3) of the Regulations of Connecticut State Agencies do not apply to industrial radiographic operations.

(n) Recordkeeping requirements.

(1) Records for industrial radiography. Each licensee or registrant shall maintain a copy of its license or registration, documents incorporated by reference and amendments to each of these documents until superseded by new documents approved by the Commissioner, or until the Commissioner terminates the license or registration.

(2) Records of receipt and transfer of sources of radiation.

(A) Each licensee or registrant shall maintain records showing the receipts and transfers of sealed sources, devices using DU for shielding and radiation machines, and retain each record for five (5) years after it is made; and

(B) Records required by this subdivision shall include the date, the name of the individual making the record, radionuclide, number of becquerels (curies) or mass (for DU), and manufacturer, model and serial number of each source of radiation and device, as appropriate.

(3) Records of radiation survey instruments. Each licensee or registrant shall maintain records of the calibrations of its radiation survey instruments that are required undersubsection (h) of this section and retain each record for five (5) years after it is made.

(4) Records of leak testing of sealed sources and devices containing DU. Each licensee shall maintain records of leak test results for sealed sources and for devices containing DU. The results shall be stated in units of becquerels (μCi). The licensee shall retain each record for five (5) years after it is made or until the source in storage is removed.

(5) Records of quarterly inventory.

(A) Each licensee or registrant shall maintain records of the quarterly inventory of sources of radiation, including devices containing depleted uranium as required by subsection (j) of this section, and retain each record for five (5) years.

(B) The record shall include the date of the inventory, name of the individual conducting the inventory, radionuclide, number of becquerels (curies) or mass (for DU) in each device, location of sources of radiation and devices, and manufacturer, model and serial number of each source of radiation and device, as appropriate.

(6) Utilization logs.

(A) Each licensee or registrant shall maintain utilization logs showing for each source of radiation the following information:

(i) A description, including the make, model and serial number of the radiation machine or the radiographic exposure device, transport or storage container in which the sealed source is located,

(ii) The identity and signature of the radiographer to whom assigned,

(iii) The location and dates of use, including the dates removed and returned to storage, and

(iv) For permanent radiographic installations, the dates each radiation machine is energized;

(B) The licensee or registrant shall retain the logs required by subparagraph (A) of this subdivision for five (5) years.

(7) Each licensee or registrant shall maintain records of inspection and maintenance of radiation machines, radiographic exposure devices, transport and storage containers, associated equipment, source changers and survey instruments, as follows:

(A) All records specified in subsection (k) of this section of equipment problems found in daily checks and quarterly inspections of radiation machines, radiographic exposure devices, transport and storage containers, associated equipment, source changers, and survey instruments; and retain each record for five (5) years after it is made; and

(B) Each record shall include the date of check or inspection, name of inspector, equipment involved, any problems found, and what repair and maintenance, if any, was performed.

(8) Records of alarm system and entrance control checks at permanent radiographic installations. Each licensee or registrant shall maintain records of alarm system and entrance control device tests required by subsection (l) of this section and retain each record for five (5) years after it is made.

(9) Records of training and certification. Each licensee or registrant shall maintain the following records for five (5) years:

(A) Records of training of each radiographer and each radiographer's assistant. The record shall include radiographer certification documents and verification of certification status, copies of written tests, dates of oral and practical examinations, the names of individuals conducting and receiving the oral and practical examinations, and a list of items tested and the results of the oral and practical examinations; and

(B) Records of annual refresher safety training and semi-annual inspections of job performance for each radiographer and each radiographer's assistant. The records shall list the topics discussed during the refresher safety training, the dates the annual refresher safety training was conducted, and names of the instructors and attendees. For inspections of job performance, the records shall also include a list showing the items checked and any non-compliance observed by the radiation safety officer or designee.

(10) Copies of operating and emergency procedures. Each licensee or registrant shall maintain a copy of current operating and emergency procedures until the Commissioner terminates the license or registration. Superseded material shall be retained for five (5) years after the change is made.

(11) Records of personnel monitoring. Each licensee or registrant shall maintain the following exposure records specified in subsection (m)(6) of this section:

(A) Direct reading dosimeter readings and yearly operability checks required by subsections (m)(6)(B) and (m)(6)(C) of this section for five (5) years after the record is made;

(B) Records of alarming ratemeter calibrations for five (5) years after the record is made;

(C) Reports received from the film badge or NAVLAP accredited processor until the Commissioner terminates the license or registration; and

(D) Records of estimates of exposures as a result of off-scale personal direct reading dosimeters, or lost or damaged film badges or other personnel dosimeter until the Commissioner terminates the license or registration.

(12) Records of radiation surveys. Each licensee shall maintain a record of each exposure device survey conducted before the device is placed in storage as specified in subsection (m)(7)(C) of this section. Each record shall be maintained for five (5) years after it is made.

(13) Form of records. Each record required by this section shall be legible throughout the specified retention period. The record may be the original, a reproduced copy, microform or an electronic copy provided that the record is authenticated by authorized personnel and is capable of being reproduced or of reproducing a clear copy throughout the required retention period. Records such as letters, drawings and specifications shall include all pertinent information, such as stamps, initials and signatures. The licensee or registrant shall maintain adequate safeguards against tampering with and loss of records.

(14) Location of documents and records. Each licensee or registrant shall maintain copies of the following records:

(A) Copies of records required by this section and other applicable sections of the Department's regulations at the location specified in subsection (c)(11) of this section; and

(B) Copies of the following documents and records sufficient to demonstrate compliance at each applicable field station and each temporary job site in a location readily accessible and clearly identified to all personnel working at such stations and job sites:

(i) The license or registration authorizing the use of sources of radiation,

(ii) A copy of sections 22a-153-1 through 22a-153-3 and 22a-153-6 of the Regulations of Connecticut State Agencies**,**

(iii) Utilization logs for each source of radiation dispatched from that location as required by subdivision (6) of this subsection,

(iv) Records of equipment problems identified in daily checks of equipment as required by subdivision (7)(A) of this subsection,

(v) Records of alarm system and entrance control checks required by subdivision (8) of this subsection, if applicable,

(vi) Records of dosimeter readings as required by subdivision (11) of this subsection,

(vii) Operating and emergency procedures as required by subdivision (10) of this subsection,

(viii) Evidence of the latest calibration of the radiation survey instruments in use at the site, as required by subdivision (3) of this subsection,

(ix) Evidence of the latest calibrations of alarming ratemeters and operability checks of dosimeters as required by subdivision (11) of this subsection,

(x) Survey records as required by subdivision (12) of this subsection and section 22a-153-2(n)(3) of the Regulations of Connecticut State Agencies, as applicable, for the period of operation at the site, and

(xi) The shipping papers for the transportation of radioactive materials required by 49 CFR Part 100-189, 390-397 and 10 CFR Part 71.

(o) Notifications.

(1) In addition to the reporting requirements specified in 10 CFR 30.50 and in section 22a-153-2 of the Regulations of Connecticut State Agencies, each licensee or registrant shall provide a written report to the Commissioner within 30 days of the occurrence of any of the following incidents involving radiographic equipment:

(A) Unintentional disconnection of the source assembly from the control cable;

(B) Inability to retract the source assembly to its fully shielded position and secure it in this position;

(C) Failure of any component, which is critical to safe operation of the device, to properly perform its intended function; or

(D) An indicator on a radiation machine fails to show that radiation is being produced, an exposure switch fails to terminate production of radiation when turned to the off position, or a safety interlock fails to terminate x-ray production.

(2) The licensee or registrant shall include the following information in each report submitted under subsection (o)(1) of this section and in each report of overexposure submitted under section 22a-153-2(o)(3) of the Regulations of Connecticut State Agencies that involves failure of safety components of radiography equipment:

(A) Description of the equipment problem;

(B) Cause of each incident, if known;

(C) Name of the manufacturer and model number of equipment involved in the incident;

(D) Place, date and time of the incident;

(E) Actions taken to establish normal operations;

(F) Corrective actions taken or planned to prevent recurrence; and

(G) Names and qualifications of personnel involved in the incident.

(3) Any licensee or registrant conducting radiographic operations or storing sources of radiation at any location not listed on the license or registration for a period in excess of 180 days in a calendar year, shall notify the Commissioner prior to exceeding the 180days.

(p) Radiographer certification.

(1) Application. In order to be certified by the Commissioner to perform radiographic operations, a person shall submit an application to Department's Bureau of Air Management,

Division of Radiation to take the examination identified in subdivision (2) of this subsection as follows:

(A) An application for taking the examination shall be made on forms furnished by the Department;

(B) A non-refundable fee of $XX.XX shall be submitted with the application to cover certification administrative costs, such as the examination, training documentation review and issuance of certification;

(C) The application and the non-refundable fee shall be submitted to the Department as specified in the application; and

(D) An individual whose certification ID card has been suspended or revoked shall obtain written approval from the Commissioner to apply to retake the examination.

(2) Examination. For the purpose of determining the qualifications of applicants, the examination shall be given according to the following:

(A) A written examination shall be held at times and places determined by the Comssioner. The scope of the examination and the methods of procedure, including determination of the passing score, shall be prescribed by the Commissioner. The examination will assess the applicant's knowledge to use sources of radiation and related equipment safely and the applicant's knowledge of sections 22a-153-2, 22a-153-3 of the Regulations of Connecticut State Agencies and 49 CFR Part 100-189, 390-397 and 10 CFR Part 71;

(B) The examination will be administered by persons authorized by the Commissioner;

(C) A candidate failing an examination may apply for re-examination in accordance with subsection (p)(1) of this section and will be re-examined. A candidate shall not retake the same version of the examination;

(D) The examination will be in English;

(E) To take the examination, an individual shall have a valid picture identification card, such as a driver's license, at the time of the examination;

(F) Calculators will be permitted during the examination, except calculators or computers with preprogrammed data or formulas;

(G) Any individual observed by a proctor to be compromising the integrity of the examination shall be required to surrender the examination, the answer sheet and any work paper. Such individual will not be allowed to complete the examination, will forfeit the examination fee, and will leave the examination site to avoid disturbing other examinees. Such individual shall wait 90 days before submitting a new application and fee to take a new examination;

(H) Examination material shall be returned to the proctor at the end of the examination. No photographic or other copying of examination questions or materials shall be permitted. Disclosure by any individual of the contents of any examination prior to its administration is prohibited; and

(I) The names and scores of individuals taking the examination shall be a public record.

(3) Certification identification (ID) card. The Department will issue a certification ID card to each person who successfully completes the requirements of subsection (m)(3)(A)(i) of this section and receives a passing score on the examination prescribed in subdivision (2) of this subsection, as follows:

(A) Each person's certification ID card shall contain his or her photograph. The Commissioner will take the photograph at the time the examination is administered;

(B) The certification ID card remains the property of the Commissioner who may revoke or suspend such card;

(C) Any individual who wishes to replace his or her certification ID card shall submit to the Commissioner a written request for a replacement certification ID card, stating the reason a replacement certification ID card is needed. A non-refundable fee of $XX.XX shall be submitted with the written request for a replacement certification ID card. The individual shall maintain a copy of the request in his or her possession while performing industrial radiographic operations until a replacement certification ID card is received from the Department;

(D) Each certification ID card shall be valid for a period of five years, unless revoked or suspended in accordance with subparagraph (F) of this subdivision. Each certification ID card expires at the end of the day, in the month and year stated on the certification ID card;

(E) The Department shall issue renewals of certification ID cards as follows:

(i) Applications for examination to renew a certification ID card shall be filed in accordance with subdivision (1) of this subsection,

(ii) The examination for renewal of a certification ID card shall be administered in accordance with subdivision (2) of this subsection, and

(iii) A renewal certification ID card shall be issued in accordance with subdivision (1) of this subsection; and

(F) The Department shall revoke or suspend certification ID cards as follows:

(i) Any radiographer who violates these regulations, equivalent Agreement State regulations, NRC regulations or any applicable state or federal statute may be required to show cause at a formal hearing as to why their certification ID card should not be revoked or suspended in accordance with subparagraph (F)(ii) of this subdivision, and

(ii) When a Department order has been issued for an industrial radiographer to cease and desist from the use of sources of radiation or the Commissioner revokes or suspends such radiographer's certification ID card, the industrial radiographer shall surrender the certification ID card to the Department until the order is changed or the suspension expires.

(4) Reciprocity. The Department will grant reciprocal recognition of radiographer certification provided that:

(A) The individual holds a valid certification in the appropriate category issued by a certifying entity;

(B) The requirements and procedures of the certifying entity afford the same or comparable certification standards as those afforded by subsection (m)(3)(A) of this section;

(C) The individual presents the certification to the Department prior to performing industrial radiographic operations in the state;

(D) No escalated enforcement action is pending and involves the applicant before the NRC or in any other state; and

(E) Individuals who are granted reciprocal certification by the Commissioner shall maintain the certification upon which the reciprocal recognition was granted, or prior to the expiration of such certification, shall meet the requirements of subsection (m)(3)(A) of this section.

(5) Radiographic personnel performing industrial radiography shall meet the following requirements:

(A) At a job site, the following shall be supplied by the licensee or registrant:

(i) At least one operable, calibrated survey instrument for each exposure device or radiation machine in use,

(ii) A current whole body personnel dosimeter for each person performing radiographic operations,

(iii) An operable, calibrated pocket dosimeter with a range of zero to 200 milliroentgens for each person performing radiographic operations,

(iv) An operable, calibrated, alarming ratemeter for each person performing radiographic operations using a radiographic exposure device, and

(v) The appropriate barrier ropes and signs;

(B) Each radiographer at a job site shall have on his or her person a valid certification ID card issued by a certifying entity;

(C) Industrial radiographic operations shall not be performed if any of the items in subdivisions (5)(A) and (5)(B) of this subsection are not available at the job site or are inoperable; and

(D) During an inspection, the Commissioner may terminate an operation if any of the requirements of this section are not met. Operations shall not be resumed until all required conditions are met.

Statement of Purpose. This section prescribes requirements for the issuance of registrations for the industrial use of sources of radiation and radiation safety requirements for persons using these sources of radiation in industrial radiography.

APPENDIX A

I. Requirements for an Independent Certifying Organization.

An independent certifying organization shall:

1. Be an organization such as a society or association, whose members participate in, or have an interest in, the field of industrial radiography;

2. Make its membership available to the general public nationwide. Membership shall not be restricted
because of race, color, religion, sex, age, national origin or disability;

3. Have a certification program open to nonmembers, as well as members;

4. Be an incorporated, nationally recognized organization, that is involved in setting national standards
of practice within its fields of expertise;

5. Have an adequate staff, a viable system for financing its operations, and a policy and decision-making review board;

6. Have a set of written organizational by-laws and policies that provide adequate assurance of lack of
conflict of interest and a system for monitoring and enforcing those by-laws and policies;

7. Have a committee, whose members can carry out their responsibilities impartially, to review and approve the certification guidelines and procedures, and to advise the organization's staff in implementing the certification program;

8. Have a committee, whose members can carry out their responsibilities impartially, to review complaints against certified individuals and to determine appropriate sanctions;

9. Have written procedures describing all aspects of its certification program, maintain records of the

current status of each individual's certification and the administration of its certification program;

10. Have procedures to ensure that certified individuals are provided due process with respect to the administration of its certification program, including the process of becoming certified and any sanctions imposed against certified individuals;

11. Have procedures for proctoring examinations, including qualifications for proctors. These procedures must ensure that the individuals proctoring each examination are not employed by the same company or corporation (or a wholly-owned subsidiary of such company or corporation) as any of the examinees;

12. Exchange information about certified individuals with the Nuclear Regulatory Commission and other independent certifying organizations and/or Agreement States and allow periodic review of its certification program and related records; and

13. Provide a description to the Nuclear Regulatory Commission of its procedures for choosing examination sites and for providing an appropriate examination environment.

II. Requirements for Certification Programs.

All certification programs must:

1. Require applicants for certification to (a) receive training in the topics set forth in 22a-153-3(m)(3)(G) or equivalent State or Nuclear Regulatory Commission regulations, and (b) satisfactorily complete a written examination covering these topics;

2. Require applicants for certification to provide documentation that demonstrates that the applicant has:

(a) received training in the topics set forth in 22a-153-3(m)(3)(G) or equivalent State or Nuclear Regulatory Commission regulations;

(b) satisfactorily completed a minimum period of on-the-job training as specified in 22a-153-3(m)(3)(A); and

(c) received verification by a State licensee or registrant or a Nuclear Regulatory Commission licensee that the applicant has demonstrated the capability of independently working as a radiographer.

3. Include procedures to ensure that all examination questions are protected from disclosure;

4. Include procedures for denying an application and revoking, suspending, and reinstating a certification;

5. Provide a certification period of not less than 3 years nor more than 5 years;

6. Include procedures for renewing certifications and, if the procedures allow renewals without examination, require evidence of recent full-time employment and annual refresher training; and

7. Provide a timely response to inquiries, by telephone or letter, from members of the public, about an individual's certification status.

III. Requirements for Written Examinations

All examinations must be:

1. Designed to test an individual's knowledge and understanding of the topics listed in 22a-153-3(m)(3)(G) or equivalent State or Nuclear Regulatory Commission requirements;

2. Written in a multiple-choice format;

3. Have test items drawn from a question bank containing psychometrically valid questions based on the material in 22a-153-3(m)(3)(G).